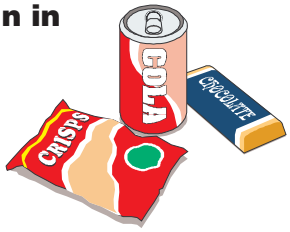
More Protein in Snacks



Snack foods are a major dietary component for many U.S. consumers. Often these crunchy favorites are made from high-starch products such as corn flour. On average, these between-meal items consist of 3 to 5 percent protein, with the rest mostly carbohydrates, fats, and sweeteners.

Now a way has been found to increase the protein in foods such as breakfast cereals, corn puffs, cheese curls, and energy bars by up to 35 percent by adding whey proteins left over from cheese-making. It wasn't easy for food technologists to figure out how to add more whey without reducing the crunchiness of the end product. But through trial and error, they found the right temperature and moisture at which to blend corn flour with whey protein isolate so that it would run through a twin-screw extruder and achieve the desired shape and consistency. This technology is available for licensing. *Charles I. Onwulata, USDA-ARS Dairy Processing and Products Research Unit, Wyndmoor, Pennsylvania; phone (215) 233-6497, e-mail conwulata@arserrc.gov.*

Bacterium Kills Costly Pests

The annual predations of just five plant pests cost U.S. farmers nearly $3 billion annually in crop losses and control expenses. These "bad guys" are the Colorado potato beetle, corn rootworm, diamondback moth, green stinkbug, and silverleaf whitefly. Now, lab tests have shown that a bacterium called *Chromobacterium suttsuga* produces multiple toxins that kill the pests. It can be combined with other compounds and then applied to soil, plants, or seeds.

Since insect pests often develop resistance to synthetic insecticides, biological-control alternatives such as this can be an important component of integrated pest-management programs. *Phyllis A. Martin, USDA-ARS Insect Biocontrol Laboratory, Beltsville, Maryland; phone (301) 504-6331, e-mail martinp@ba.ars.usda.gov. Jeffrey R. Aldrich, USDA-ARS Chemicals Affecting Insect Behavior Laboratory, Beltsville, Maryland; phone (301) 504-8531, e-mail aldrich@ba.ars.usda.gov.*

Nitrates—A Long Time Draining

A chance finding has shown that unused nitrate applied as fertilizer during crop production can take a long time to percolate through the soil to groundwater. This was confirmed during preparations for a new study on the movement of nitrate through soil. It apparently took nearly 30 years for nitrate applied during an experiment conducted from 1969 to 1974 to move through subsurface soils and reach a water table 60 feet below the soil surface.

In that earlier study, done on a 74-acre research site in western Iowa, researchers applied fertilizer to soil at 3 times the normal rate and then tracked its concentration and movement through soil for the next 10 years. Then, in 1996, scientists were preparing to monitor groundwater for a new experiment when they detected the nitrate 60 feet deep in the soil. To confirm that it was residue from the nitrate applied in 1969, they examined groundwater flow rates and ages and compared the depth of the concentration with streamflow records. This finding shows that it may take several decades to fully know the effects of farm practices—or improvements made to them. *Mark David Tomer and Michael R. Burkart, USDA-ARS National Soil Tilth Laboratory, Ames, Iowa; phone (515) 294-0213 [Tomer], (515) 294-5809 [Burkart], e-mail tomer@nstl.gov, burkart@nstl.gov.*

Modified Grain Sorter Spots Mycotoxins

Many outside plants can be infested with fungi that produce potentially harmful compounds called mycotoxins. In favorable conditions, these fungi can infect crops such as corn, cottonseed, wheat, or peanuts, producing toxins that can cause serious illness in livestock and may be carcinogenic to humans. But detecting the fungi on large-volume crops like grain—and removing them—is a big challenge to commodity handlers.

Now an engineer has used near-infrared spectroscopy to transform a standard grain sorter into a fast, effective tool for detecting two important mycotoxins that occur in corn: aflatoxin, produced by some strains of *Aspergillus flavus*, and fumonisin, produced by *Fusarium* fungi. He added a pair of filters that correspond to two bands of infrared light needed to detect aflatoxin and fumonisin.

One pass through this modified sorter detected and removed 80 percent or more of corn infected with the two mycotoxins. And the sorter mistakenly rejected only 5 percent of uncontaminated corn instead of upwards of 10 percent. *Tom C. Pearson, USDA-ARS Grain Marketing and Production Research Center, Manhattan, Kansas; phone (785) 776-2729, e-mail tpearson@gmprc.ksu.edu. Donald T. Wicklow, USDA-ARS Mycotoxin Research Unit, Peoria, Illinois; phone (309) 681-6243, e-mail wicklodt@ncaur.usda.gov.*